Lesson 5

**Non-Linear equation** = Equation whose graph does not form a straight line (linear) is called a Nonlinear Equation.

In a nonlinear equation, the variables are either of degree greater than 1 or less than 1, but never 1.

**Examples of nonlinear equations**

4*x*2 + 2*y -* 1 = 0

* *x*3 + 2*x*2 *-* 4*xy* - 1 = 0
* 

**Example 1:** Which of the following equations is not a linear equation?

**Choices:**

A. 4*x* - 5 = ¼x

B. 8 + *x* = 7

C. (*x* + 2)2 = 6

D. *x* = 2

**Correct Answer: C**

**Solution:**

**Step 1:** An algebraic equation is said to be linear if the variable or variables in the equation are of first degree.

**Step 2:** In the equation (*x* + 2)2 = 6, x is raised to the power 2.

**Step 3:** So, (*x* + 2)2 = 6 is **not a linear equation.**

**Example 2:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | 1 | 2 | 3 | 4 |
| Y | 2 | 4 | 6 | 8 |

The table above represents a nonlinear function. Every *y*-value is the square of its corresponding *x*-value. The difference in output values is not constant. This table is an example of a quadratic function.

In a **linear** function, the output values have a difference, which is constant. The

constant difference is equivalent to the slope of the line.

Linear equations are all equations that have the following form: **y = mx + b**.

**M = slope and b = y-intercept**

**Example**:

y = 2x + 5 with m = 2 and b = 5

y = -3x + 2 with m = -3 and b = 2

y = 4x + - 1 with a = 4 and b = -1

**Example:** I am thinking of a number. If I add 2 to that number, I will get 5. What is the number?

Although it may be fairly easy to guess that the number is 3, you can model the situation above with an equation. Let x be the number in my mind.

Add 2 to x to get 5

Adding 2 to x to get 5 means that whatever x is, when I add 2 to x, it has to equal to 5

The equation is 2 + x = 5